Alcohol Tobacco & Caffeine

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ALCOHOL — Introduction

Alcohol is one of the world's most widely used drugs. Roughly 75% of North American adults drink alcohol to some extent. In Alberta, 80% of people over 17 years of age use beverage alcohol.

The majority of these people drink moderately, averaging fewer than three drinks per day. Approximately 6% of them, however, drink amounts considered to be hazardous to health — that is, more than 9 ounces of "hard liquor" or 5½ bottles of beer a day.

Excessive drinking is frequently a cause of, or a contributing factor in, physical health disorders, mental illness, disruption of home and family life, job loss, accidents and crime.

Alcohol use has been increasing in North America, among teenagers in particular. *In Alberta, annual per capita consumption of pure alcohol for each person of legal drinking age increased between 1966-78 by 44% to a new high of 3.28 gallons.*

The production and distribution of beverage alcohol is a thriving industry in Canada, providing a major source of tax revenue for governments. In 1979, our federal and provincial governments collected more than $1.3 billion in revenue from the control and sale of beverage alcohol, with sales totalling $4.3 billion.

Unlike other alcohols such as methyl (wood) alcohol or isopropyl (rubbing) alcohol, small amounts of ethyl alcohol are relatively safe for human consumption.

Ethyl alcohol — referred to from here on as "alcohol" or "beverage alcohol" — is a by-product of the process of fermentation which occurs naturally under certain conditions in fruit, grain, vegetables and other foods. During fermentation, yeasts metabolize sugar to produce alcohol and carbon dioxide. The maximum concentration of alcohol produced through fermentation is about 14%. This strength can be increased by distillation or by fortification — that is, by the addition of alcohol.

Alcoholic beverages come in three basic types: beer, wine, and distilled spirits or "hard liquor".

Beer is made from cereal grains which are malted to produce maltose sugar, then fermented, and usually flavoured with hops. Canadian beer generally contains about 5% alcohol by volume. In 1979, the Canadian brewing industry produced 482 million gallons of beer from about 161 million pounds of edible cereal grains.

Wine is made from fermented fruit juice, and is usually 7-14% alcohol. Fortified wines such as sherry, port and vermouth contain

16-20% alcohol. In 1979, Canadian wineries used about 214 million pounds of grapes and other fruits to produce 25 million gallons of wine.

Distilled spirits such as whiskey, rum, brandy, gin and vodka are made by distilling fermented brews. These beverages are generally marketed at an alcohol concentration of around 40%. In 1979, Canadian distillers consumed about 903 million pounds of various cereal grains to produce 66 million proof gallons of alcohol.

A 12-ounce bottle of beer contains about the same amount of alcohol as a 1½ ounce shot of distilled spirits, a 5-ounce glass of table wine, or a 3-ounce glass of fortified wine. These amounts — each containing about 0.6 ounces of pure alcohol — are used in this pamphlet to define "one drink".

The "proof" of a beverage is one measure of its alcohol content. In Canada and the United Kingdom, "100 proof" means 57% alcohol; in the United States, it means 50% alcohol.

In addition to pure ethyl alcohol, alcoholic beverages contain various substances known as "congeners". Congeners contribute to the flavour of the beverage, and to some extent, determine the physiological effects and after-effects of drinking, or "hangover".

Alcoholic beverages contain calories but no vitamins, minerals, protein or other elements essential to proper nutrition. One drink may contain 90-150 calories or more, depending upon the type of beverage and mixer used.

The Physical Effects of Alcohol

Soon after drinking, alcohol normally passes through the walls of the stomach and upper intestines into the bloodstream and throughout the body.

Individuals eliminate alcohol from their bodies at a relatively constant rate which varies from person to person. An average 150 pound man, for example, metabolizes (breaks down) about 0.3 ounces of alcohol in an hour. Alcohol is metabolized primarily in the liver. About 5% of the drug is eliminated unchanged via the breath and urine.

The degree of intoxication reached is closely related to the concentration of alcohol in the blood — that is, the blood alcohol level, or "BAL". Besides the amount of alcohol consumed, other factors help to determine the BAL, the peak BAL (the highest BAL

reached), and of course, the degree of intoxication. These are:

- *Speed of drinking:* A faster rate of drinking produces a higher peak BAL.
- *Body weight:* Because larger people have more blood, their BAL is lower than that of smaller people who drink the same quantity of alcohol. Alcohol invades muscle tissue to a greater extent than fatty tissue, however, so that obese persons probably have higher BAL's than do slender persons of the same weight after drinking the same amount of alcohol.
- *Presence of food in the stomach:* Eating just before or while drinking slows down the absorption of alcohol in the system resulting in a lower peak BAL. Drinking after an average meal can reduce the peak BAL by almost half that reached when drinking the same amount on an empty stomach.
- *Drinking experience:* Experienced drinkers may appear to be less impaired than novice drinkers consuming the same amount of alcohol, but this may be because many people learn, over a period of time, to disguise their impairment.
- *Individual factors:* Differences in health and physiological or genetic make-up may influence the rate at which alcohol is absorbed or metabolized.
- *Emotional factors:* Excitement, anger, fear, stress or nausea can influence the BAL.
- *Type of beverage:* Beer and sweet wine are absorbed more slowly into the system than are dry wine or hard liquor, and therefore may produce a lower peak BAL. Generally, the rate of absorption is lower in beverages with lower concentrations of alcohol and higher congener contents. Diluting an alcoholic beverage with water can slow down absorption, while mixing with carbonated beverages may actually increase the absorption rate.

Of these factors, only speed of drinking, body weight, and presence of food in the stomach have a significant effect upon the degree or course of intoxication.

Compared to absorption, the elimination of alcohol from the bloodstream occurs slowly. No proven method is known for speeding up this process. Despite the persisting myths, drinking black coffee or taking a cold shower does not help the drinker "sober up".

As an anaesthetic and depressant, alcohol produces effects similar to those of barbiturates, and inhalants such as solvents and *volatile anaesthetics*. Initially, drinking usually has a stimulating

effect on the drinker. As a drinking session continues, however, alcohol progressively depresses the individual's level of activity.

As with most drugs, the psychological effects produced by alcohol depend greatly upon the drinker's personality and mood, and the drinking situation. The same amount of alcohol may produce drowsiness or lethargy on one occasion; on others, laughter and gaiety, or fighting and belligerence.

Generally, one or two drinks produce a feeling of cheerfulness, well-being and mild sedation. In social settings, the drinker may feel more relaxed, less tense and anxious, and appear to be less inhibited, more out-going or sociable.

At later stages of intoxication, some individuals may begin to lose emotional control — exhibiting anxiety, withdrawal, self-pity or depression. Depending upon personality and circumstances, a drinker may become obstinate, abusive, aggressive, even violent. Fights are common in many drinking settings.

In some situations, a moderate intake of alcohol may improve performance of certain skills by increasing the individual's sense of self-confidence. Usually, however, alcohol impairs performance on complex tasks — especially those requiring careful attention and/or the use of skills recently acquired.

Contrary to another prevailing myth, alcohol is not an aphrodisiac. Although it may stimulate sexual desire and opportunity through the lessening of inhibitions, it can have a detrimental effect upon sexual performance.

Driving ability is clearly affected by alcohol. If an individual consumes three or four drinks within an hour, the alcohol will interfere with his perception, attention, judgement and motor skills. It may also increase risk-taking and aggression in the driver.

Physical changes resulting from moderate consumption of alcohol may include temporary impairment of heart function, flushing of the skin resulting in a sense of warmth, lowered body temperature, appetite stimulation, increased saliva flow, gastric secretion and urination, and blood-shot eyes.

Consumption of six to eight drinks in an hour typically produces drunkenness, disorientation and confusion, slurred speech, blurred vision, poor muscle control, and, especially in novice drinkers, nausea and vomiting. This speed of drinking may also cause blackout — that is, a loss of memory for events which occurred while intoxicated.

The consumption of still larger quantities of alcohol may produce

stupor, anaesthesia, unconsciousness and coma. Extremely high dosages may cause death due to stoppage of the heart or breathing. Death from overdose is usually prevented when the drinker vomits or passes out before consuming lethal amounts.

Following is a summary of these effects:

After-effects of immoderate drinking include hangover (characterized by nausea, fatigue, headache, weakness, dizziness and poor coordination), heartburn, and other aches and pains. Morning-after symptoms may include feelings of anxiety and depression. The severity of these symptoms depends mainly upon the amount of alcohol consumed. To a lesser degree, morning-after symptoms are influenced by the type of beverage alcohol and mixes drunk, and the remembered events of the drinking session.

Drinks with a lower congener content — such as vodka — produce a less severe hangover than do high congener beverages like whiskey and bourbon.

DRINKING GUIDE (for a 150 lb man)

Number of drinks as defined above (per hour)	Blood alcohol level (BAL)	Approximate elimination time (hours)	Typical Effects
1	021	2	mild changes
2	041	4	slight relaxation increased sociability
3	064	6	moderate impairment, lessened inhibitions
	08 — THE LEGAL LIMIT OF INTOXICATION		
4	086	8	impaired judgement and coordination
7	15	14	obviously drunk
14	30	28	stuporous
18	40	36	unconscious, possibly in coma, on verge of death
24	50 +	?	death may result

Tolerance, Dependence and Withdrawal

Frequent drinking may lead to an increased tolerance for alcohol — that is, a greater capacity to "hold liquor" without becoming sick, passing out, or showing obvious signs of drunkenness. An excessive drinker may be able to consume two or three times as much

alcohol as a novice drinker, for example, and outwardly show the same signs of intoxication.

Increased alcohol tolerance means that the drinker requires more alcohol to achieve the same desired effect. With continued practice, the drinker may extend alcohol intake to a level which is dangerous.

Learning plays an important role in the development of increased tolerance. Experienced drinkers have learned what to expect from alcohol, and adjust their behaviour to disguise impairment. However, the lethal level of alcohol is relatively unaffected by increased tolerance, so that consumption of very large amounts of alcohol remains dangerous even for veteran drinkers. Alcohol tolerance may eventually decline in some chronic abusers as a result of liver damage, gastritis, or other physical disorders.

Closely related to increased tolerance is the development of physical dependence upon alcohol. It is possible, however, for a person to have a high tolerance for alcohol without being physically dependent. Tolerance may even increase as a result of occasional drinking, whereas physical dependence generally occurs only with daily or continuous drinking.

Physical dependence occurs when body tissues have adjusted so as to function adequately in the presence of alcohol. When persons physically dependent upon alcohol stop drinking, they exhibit withdrawal symptoms as their bodies attempt to readjust to function without alcohol. These withdrawal symptoms may include loss of appetite, nausea, anxiety, sleeplessness, irritability, confusion, tremors (sometimes known as "the shakes"), sweating, and in some cases, convulsions, cramps, vomiting, illusions and hallucinations.

Left untreated, severe cases of withdrawal can result in delirium tremens (the "D.T.'s"), heart failure, even death. Withdrawal from alcohol is actually more life-threatening than withdrawal from heroin.

Psychological dependence upon alcohol is relatively common and often tolerated or accepted in our society. Psychological dependence represents a strong need to experience a drug's effects repeatedly, even in the absence of physical dependence.

The Hazards of Drinking

Moderate usage of alcohol over long periods has no apparently

harmful effects upon the vast majority of healthy individuals. However, immoderate drinking — an average of five to six drinks or more per day — is hazardous to health, and often leads to serious alcohol-related problems.

Health Problems Related to Alcohol

Excessive drinking carried on for long periods can interfere with appetite and the body's normal utilization of food. This interference can result in a variety of disorders associated with malnutrition such as scurvy, pellagra, and beri-beri. After years of immoderate drinking, irreversible liver damage (cirrhosis), as well as other liver disorders, including hepatitis, develop.

Along with other factors such as smoking, alcohol contributes to heart disease and other circulatory disorders which are a major cause of death among immoderate drinkers.

Other problems encountered among high risk drinkers are pancreatitis, gastrointestinal difficulties, ulcers, various forms of cancer, infectious diseases such as tuberculosis and pneumonia, and muscle disorders.

Although many alcohol-related disorders of the nervous system can be traced to vitamin deficiency or a lack of other essential nutrients, alcohol can also directly damage nerve tissue. One of the more serious brain disorders is Wernicke-Korsakoff's syndrome, whose symptoms may include disorientation, clouded thinking, memory failure, hallucinations, rigidity of the limbs and uncontrolled reflexes.

In 1971, more than 10,000 or 17% of first admissions to psychiatric wards and institutions in Canada were related to excessive usage of alcohol.

Consumers of large quantities of alcohol have higher death rates than do moderate drinkers or non-drinkers. Besides the health complications and diseases mentioned above, alcohol is frequently implicated in accidents, suicides, homicides and poisonings.

Among diagnosed alcoholics in Ontario, the suicide rate was six times greater than the average. In 1971, a total of 1 329 deaths in Canada were directly caused by alcohol — most of them cases of cirrhosis of the liver.

Alcohol is also a significant cause of automobile, air and rail crashes, and accidents in industry and the home.

Alcohol Combined with Other Drugs

Individuals who drink alcohol — particularly those who drink heavily — are likely candidates for other drugs. Heavy smoking is often associated with excessive drinking, a combination which contributes to many health problems. When alcohol is used with other depressant drugs like barbiturates, opiate narcotics, or certain tranquilizers and sedatives, the effects of both may be exaggerated or prolonged. Some of these combinations impair driving ability greatly.

Many poisonings and deaths have resulted from the interactions of alcohol with other drugs. In 1971, for example, alcohol used with barbiturates accounted for more than half of drug-interaction deaths in Canada.

Alcohol and Crime — Another Combination

Alcohol is strongly and consistently related to crime. In 1971, approximately 13% of all convictions in Canada were for alcohol-related offences such as drunkenness, violations of liquor control laws or impaired driving. Often, the usage of alcohol is associated with juvenile delinquency, homicide, assault and rape.

Alcohol and Driving

Alcohol is a major cause of automobile accidents. In Alberta in 1980, approximately 20% of drivers involved in fatal accidents were impaired, while 13% of those involved in non-fatal accidents were impaired.

Even among expert drivers, alcohol begins to affect driving at blood alcohol levels (BALS) as low as .04%. At BALS of .08 to .10%, the risk of serious crashes increases rapidly. These risks increase with fatigue, inattention and inexperience.

Under the Criminal Code of Canada (Section 236) it is an offence to drive an automobile with a blood alcohol level of .08% or more — a level which the average person reaches after consuming 3 to 4 drinks in an hour.

A driver suspected of being impaired can be charged with impaired driving even without a breath test (Section 234). Refusal to take a breath test is an offence (Section 235).

Who Uses Alcohol?

Many people view alcohol as an effective social lubricant which helps liven up parties or stimulate business discussions. Usually, people drink alcohol to relax, feel good, celebrate, promote sleep, relieve physical discomforts, stimulate appetite, or simply to quench thirst.

Often, unwittingly, parents and other adults provide examples of drinking behaviour which children then imitate. The advertising of alcohol can powerfully influence young people's attitudes and habits. Recent decreases in the legal drinking age in many parts of North America have made it easier and more acceptable for teenagers to drink alcohol.

Few people agree on what forms of alcohol usage should or should not be considered acceptable. Within certain religious or ethnic groups, the consumption of alcohol is clearly defined according to social customs or rituals. However, in society at large, most people are left to decide for themselves how much to drink, how often, where, and with whom and under what circumstances.

Legal controls on drinking behaviour do exist, but regulations are often confused, inconsistent and weakly enforced.

Alcohol and the Law

The federal government regulates the manufacture, importation and quality control of all beverage alcohol in Canada, and determines the laws concerned with drinking and driving. The provincial and territorial governments, on the other hand, control the distribution of beverage alcohol, regulate prices, hours of sale, the legal drinking age, and other conditions under which alcoholic beverages can be sold.

In recent years, there has been a trend toward increased availability of alcohol. This trend has been criticized on the basis that any measure which increases total consumption of alcohol also appears to increase the extent of alcohol-related problems. As a result, it may be necessary to introduce policies which reduce the consumption of alcohol in order to prevent substantial increases in the health and social costs of alcohol-related problems.

Tips for Sensible Usage

It is up to any person of legal age — 18 years in Alberta — how often, if at all, they will drink; how much; with whom; where; and under what circumstances. In general, the less an individual drinks, the less the risk of developing alcohol-related problems. Specifically:

- make your own decision whether or not to take a drink. Accept or decline graciously. Moderate use of alcohol is acceptable; immoderate use isn't.
- reserve the usage of alcohol for special occasions.
- plan to get someone who is not drinking to drive the car, or take a taxi.
- drink moderately to prevent hangover.
- set a good example for others, especially if they are children.

TOBACCO — Introduction

Early explorers in North America discovered the custom of tobacco smoking among the Indians. Finding the practice agreeable, they took it with them back to Europe. Since then, tobacco has come into use throughout the world.

Until the early 1900's, tobacco was smoked mainly in pipes and cigars, chewed, or sometimes inhaled as "snuff". Although it was known to be addictive, many people used it as a medicine for a wide range of disorders.

With the introduction of factory-made, pre-rolled cigarettes around 1910, smoking became an easier, more convenient activity. More people than ever began to smoke. Those who used the new, milder cigarettes inhaled more smoke, thereby increasing their intake of hazardous substances. Most of these new smokers were men. Women began to smoke in large numbers during World War II.

Following the release of the U.S. Surgeon General's report on smoking in 1964, the long-term health consequences of smoking began to emerge as a public issue.

In 1979, a Statistics Canada survey showed that, among adults 20 years and over, 40% of males and 31% of females smoked daily. Among teenagers 15 to 19 years of age, 26.8% of boys and 26.4% of girls used tobacco daily. It is likely that official figures

underestimate the real rate of tobacco usage among teenagers, since surveys of school populations indicate that the percentage of teenaged males and females who smoke daily is closer to the respective adult smoking rates.

In the period 1965-72, regular smoking increased among teenaged females, but has since stabilized. Among teenaged males, it has declined consistently since 1970.

By 1979, about 6.0 million Canadian teenagers 15 years of age and older smoked regularly.

In recent years, the overall proportion of smokers in Canada has declined. In 1965, half (49.8%) of all Canadians 15 years and older smoked. In 1974 the figure had dropped to 44.7%. By 1979, it was 34%. Today, non-smokers are the majority.

However, there has been a small increase in average consumption by regular smokers from 18.2 cigarettes per day in 1977 to 18.6 cigarettes per day in 1979.

What Are the Components of Tobacco Smoke?

Tobacco smoke consists of more than 3,000 different components and is about 90% gaseous and 10% particles. From the health standpoint, the most treacherous gas found in tobacco smoke is carbon monoxide; the most dangerous particles, nicotine and tar.

When tobacco burns, it gives off carbon monoxide — a colourless, odourless, poisonous gas. From 1 to 5 percent of cigarette smoke is composed of this gas.

Tar, another component of tobacco smoke, consists of hundreds of chemicals.

At least 10 of the hydrocarbons in tobacco smoke are carcinogens; that is, cancer-causing. Co-carcinogens are also present. These are substances which, themselves, do not cause cancer but which help carcinogens do so.

The tar content in Canadian cigarettes currently ranges from .7 mgs to 21 mgs — the average being about 13 mgs.

The most potent of all substances in tobacco smoke, however, is nicotine. An oily alkaloid poison, nicotine can act as a stimulant, a depressant, or a tranquilizer. It is probably nicotine to which most smokers become addicted.

Commercially, nicotine is used as a pesticide. Shot directly into a person's bloodstream, the lethal dosage of nicotine for a human

adult may be no larger than the amount of this drug present in two cigarettes.

In Canadian cigarettes the amount of nicotine varies from .1 mg to 1.6 mgs — the average content being about .9 mgs per cigarette.

Other poisonous substances in tobacco smoke include hydrogen cyanide, nitrogen oxide, aldehydes, ammonia, arsenic, methane and lead.

The Physical Effects of Tobacco

The way in which an individual's body reacts to tobacco smoke depends upon (a) the length of time that smoking has been practiced, (b) the levels of nicotine and tar in the smoke, (c) the density of the smoke entering the lungs, (d) the depth of the individual's breathing pattern.

The novice smoker may experience dizziness, rapid pulse, clammy hands, nausea, vomiting or diarrhea. If cigarette usage continues, the smoker's body will adapt quickly to the intake of tobacco smoke so that the physical side-effects may become less noticeable.

From each inhaled puff of cigarette smoke, carbon monoxide enters the bloodstream, impairing the blood's ability to absorb oxygen. Because the smoker's body must then function with less oxygen, the capacity to do physical tasks declines. This reduction in oxygen supply also creates serious problems in smokers suffering from hardening of the arteries (arteriosclerosis).

Tars from tobacco smoke build up in the smoker's respiratory or breathing passages. Within a year, a moderate smoker inhales about a pound of tar. When the body tries to expel these deposits, smoker's cough develops.

Carbolic acid (phenols) in tobacco smoke deadens the tiny, hair-like projections along the respiratory tract, preventing them from effectively removing foreign matter from the bronchial tubes and carcinogens from the lungs.

Nicotine has a wide range of effects upon the smoker's central nervous system, cardiovascular system and respiratory system. For example, nicotine spurs the heart and adrenal glands to release stimulants which raise the smoker's heart rate and blood pressure. At the same time, this drug reduces the size of the blood vessels in the smoker's hands and feet.

The heart pumps harder, but with a blood supply which carbon

monoxide has seriously depleted of oxygen. Acting against one another this way, nicotine and carbon monoxide are believed to promote heart disease and trigger heart attacks.

By stimulating the production of digestive juices, cigarette smoke also interferes with the stomach's functioning...often reducing the smoker's sense of taste and appetite.

Tolerance, Dependence and Withdrawal

For most smokers, usage of tobacco becomes an addiction, a kind of drug dependency. Just as with other drug dependencies, regular tobacco usage results in building up of tolerance to the effects of tobacco, compulsive usage, and, if stopped abruptly, symptoms of withdrawal.

Unlike most other drug dependencies, however, tobacco usage is accepted socially and the smoker faces little danger of overdose or disruption in everyday functioning, at least in the short term. Indeed, the stimulative and stress-reducing actions of smoking may even strengthen some people's ability to function day-to-day.

Scientists agree that dependency upon tobacco involves the need to regulate and maintain an adequate level of nicotine in the brain. Most smokers regularly experience the urge — really, the compulsion — to use tobacco an average of every 20 to 30 minutes. Consumption beyond the 10 cigarette-per-day level usually results in dependence.

A cigarette smoker may take two to three years to develop a tolerance for a high intake of nicotine. Most smokers eventually level off at the 15 to 20 cigarettes-per-day range. Only about 4% of Canadian smokers limit themselves to occasional usage of tobacco.

For most smokers, therefore, smoking becomes an efficient and addictive form of drug-taking. Each puff of inhaled smoke "injects" a "shot" of nicotine...some 50,000 "shots" a year for the pack-a-day, average smoker. Through the lungs, the drug enters the smoker's bloodstream, reaching the brain in seconds. Such frequent results, and rapid enforcement, help to establish addiction and maintain it.

Although nicotine appears to have pleasurable effects for most smokers most of the time, tar, carbon monoxide, and other substances in tobacco smoke probably combine with nicotine to enhance the smoking experience further. Taste, smell, and the

ritualistic aspects of smoking are highly rewarding for smokers who do not inhale while, among the social influences, peer pressure is recognized as a prime reinforcing factor. These points, together, indicate that tobacco usage is a complex, highly individualistic activity which is not yet completely understood.

Withdrawal from cigarettes usually produces both physical and psychological symptoms such as nervousness, drowsiness, and anxiety. Many smokers who kick the habit and undergo withdrawal speak of lightheadedness, loss of energy, fatigue, insomnia, and constipation or diarrhea. They mention also a craving for tobacco and food, lessened capacity to concentrate and social discomfort and depression.

Sometimes addicted smokers who quit smoking experience "conditioned craving". This is a hidden compulsion to use tobacco which remains dormant until released by environmental cues or emotional states such as a smoky bar or anxiety, which the smoker associated with the habit.

Although symptoms experienced by smokers who stop using tobacco are variable and short-lived, they do indicate physical withdrawal. So smoking is a true addiction.

Hazards of Tobacco Smoking

Scientific studies completed over recent years strongly link cigarette smoking with increased risk of serious health problems and decreased life expectancy.

The studies show that:

- smoking increases the risk of death from lung cancer by as much as 10 times,
- smoking is associated with cancer of the lung, larynx, esophagus, lips, mouth, pancreas, kidneys and bladder,
- the chances of smokers developing chronic bronchitis or pulmonary emphysema — both serious lung diseases — are 3 to 20 times greater than for non-smokers, depending upon the age of the smoker and amount smoked,
- heart disease occurs 50 to 70% more often among smokers than non-smokers,
- many other disorders are connected with smoking, such as strokes, ulcers, sinusitis, narrowing or blocking of blood vessels in the arms and legs (peripheral vascular disease), diseases of the teeth and gums, and wrinkling of facial skin,

- smokers lose more days at work and school due to illness than do non-smokers. In fact, heavy smokers between the ages of 40 and 66 are hospitalized 50% more often than are non-smokers,
- Canadians bear a financial cost for tobacco smoking. In 1977, for example, the combined cost of medical care, lost income from illness and death, and property destroyed by fire — all attributed to smoking — exceeded one billion dollars! These costs are expected to exceed 1.5 billion dollars in 1981.
- pipe and cigar smokers face the same types of risks as cigarette smokers. The risks are less, however, because pipe and cigar smokers inhale little or no smoke. Nevertheless, pipe-smoking can cause cancer of the lips, and is associated with cancer of the esophagus, larynx and pharynx.

The risks of health problems and premature death which smokers experience increase in proportion to the number of cigarettes they smoke daily. Among young men who smoke more than two packs a day, for example, life expectancy is reduced by an average of eight years. For those who smoke less than half a pack a day, life expectancy is reduced by an average of four years.

Historically, the rates of early death have been higher for male than female smokers. This is because smoking among women became popular only after 1940. In the decades that followed, women became heavier users of tobacco so that, in recent years, they, too, began dying from the heart, lung and circulatory diseases which formerly were associated almost exclusively with male smokers.

The table below indicates the greater proportion of deaths among smokers compared to non-smokers, according to the former's daily consumption of cigarettes.

The proportion of excess deaths of smokers over non-smokers according to the smoker's daily consumption of cigarettes.

No. of cigarettes smoked daily	% of excess deaths of smokers over non-smokers
1 - 10	40% more deaths
11 - 19	70% more deaths
20 - 39	90% more deaths

This table illustrates the point made earlier that, as smokers

increase their daily consumption of cigarettes, they also increase their chances of dying at an earlier age than non-smokers.

The age at which a person starts smoking is an important life-expectancy factor. Among smokers who begin smoking before age 20, the rate of excess deaths over non-smokers approaches 100%.

For those who stop smoking, the risk of early death declines, and their life expectancy increases to nearly that of non-smokers. The sooner a smoker quits smoking, the better the chances are of reaching a normal life expectancy.

Instances of nicotine poisoning have occurred from time to time — usually among children who have eaten tobacco. Fortunately, death occurs only rarely in these cases since nicotine usually makes the victim vomit and expel the eaten tobacco before a fatal dose is absorbed.

How Tobacco Smoke Affects Non-smokers

In poorly ventilated rooms and other similar conditions, tobacco smoke can accumulate to levels beyond the safety limits set down in air-pollution regulations. In environments such as these, non-smokers automatically inhale the tobacco smoke in the "common" air, creating a situation where they are smoking involuntarily. Just like the smokers around them, these non-smokers absorb carbon monoxide, tar, nicotine, and other components of tobacco smoke.

Although some non-smokers are not bothered by tobacco smoke, others regard it as an irritating and harmful pollutant. The smoke leaves an unpleasant odor on their clothes and hair, they claim. Some non-smokers are allergic to tobacco smoke, reacting to it with symptoms such as stinging eyes, runny nose, asthma, hives, dermatitis, migraine headache, and upset stomach.

Involuntary smoking can shorten the life-span of some currently healthy persons. For people with serious lung and heart disease, the health and life risks are both immediate and severe.

Mothers who smoke during pregnancy expose their babies to an increased risk of death from Rh blood disease (an incompatibility between the mother's and baby's blood), fatal birth defects, and premature and stillbirths.

Birth statistics show consistently that babies born to smoking mothers weigh less at birth, have more respiratory tract infections during the first year of life, and are more likely to die of crib death

than are babies of non-smoking mothers.

About 11% of infant deaths which occur before, during, or shortly after birth are at least partially due to maternal smoking.

A pregnant woman smoking as few as five cigarettes a day throughout her pregnancy can damage the fetus. The risks to both mother and child increase with the number of cigarettes smoked. About 40% of all pregnant women in Canada smoke during pregnancy.

Present findings about the long-term effects of maternal smoking are inconclusive. Some studies show that children 11 years of age whose mothers smoked during their gestation period lagged measurably in physical, intellectual and social growth behind the same-age youngsters of non-smoking mothers. Other studies detected no IQ impairments, however, and differences in size disappeared by age seven.

Research shows that children of parents who smoke experience twice as many respiratory illnesses as do children of non-smoking parents.

Smoking adversely affects sexual functioning in both men and women. Women over 30 who smoke cigarettes and use the birth control pill significantly increase their chances of sustaining a heart attack, stroke or death.

Why Smokers Start

More than half of all Canadian teenagers who smoke puff their first cigarette by the age of 12. By the age of 18, the majority smoke regularly.

Some young people who start smoking do so in response to pressure from friends to begin. Others are encouraged by the example of the parents or the desire for an adult image or status. Still other youngsters try smoking cigarettes out of curiosity or from a wish to defy social restrictions. The image and lifestyle presented by cigarette advertising also encourages children and adolescents to smoke.

If the beginning smoker experiences the encouraging social forces more strongly than the initial unpleasant side-effects commonly associated with smoking, the chances are good that smoking will continue after the side-effects disappear.

Feelings of satisfaction, contentment, relaxation or "a lift" derived from continued smoking can reinforce the practice. Soon, the

addictive pattern of using tobacco regularly begins to develop.

About 70% of adolescents who smoke continue to do so for the next 40 years.

Kicking the Habit

Just as there are social and psychological forces acting upon the individual to begin smoking, so there are pressures from family, friends and associates and other inducements to quit.

Anti-smoking groups have become increasingly active in recent years, successfully lobbying governments and organizations to adopt no-smoking regulations and restrictions on cigarette advertising.

Kicking cigarette addiction can include a number of direct, positive results. Among the short-term benefits cited by individuals who have given up the habit are:

- better "wind" for physical activities
- increased ability to sleep soundly
- feeling more refreshed, clear-headed and alert
- an improved ability to taste and smell
- cleaner, fresher breath
- feeling pride for having been able to stop
- greater self-confidence
- more money for other pleasures

In the long run, the ex-smoker can expect:

- a longer life
- reduced risks of lung cancer and other diseases
- fewer absences from work and school

More than 60% of Canada's adult, regular smokers attempt to quit smoking. Of the minority who succeed, many do so without any kind of formal support or treatment.

A variety of treatment methods designed to help people give up or cut down on their smoking have been used with varying degrees of success. Techniques such as self-management programs, behaviour modification (unlearning), and group therapy have demonstrated some success. Recently, hypnosis, meditation, muscle relaxation, acupuncture and other relaxation procedures have been used.

In the long term, however, the various techniques and therapies to end smoking appear to be effective only for a minority of "quitters". Only about 20% of smokers who complete treatment re-

main ex-smokers for more than a year.

Gradual or sudden withdrawal ("cold turkey") can also sever the smoking habit — with or without the aid of substitute oral action such as chewing gum or eating snacks.

Family, friends, and other acquaintances can focus strong social pressures upon the smoker. While such pressures can encourage a person to give up smoking, they can also intensify feelings of shame or guilt in those who try to stop smoking but fail.

Despite these social pressures, potential health benefits, and easy access to stop-smoking techniques, the majority of smokers who "give up" cigarettes do, in fact, resume the practice eventually.

Reducing the Hazards of Tobacco Smoking

The major cigarette manufacturers have attempted to make cigarettes safer by reducing the tar and toxic levels in tobacco, and by introducing filters.

While it is true that tar levels can be reduced by changing the type of tobacco, paper, and filters used, the mortality risk among filter-cigarette smokers still remains higher than for non-smokers.

Reducing the tar and nicotine levels of cigarettes lowers the risks to health only partially since many smokers apparently compensate for this reduction by smoking more cigarettes, taking more puffs per cigarette, or by smoking their cigarettes to shorter butts. Some claim that the adverse effect of nicotine on the heart and circulatory system could be avoided if a substitute for that drug were developed.

People are becoming increasingly aware of the health hazards associated with tobacco smoking. Their growing awareness stems from the publicity paid to findings from several decades of research into the effects of this habit.

The accumulated evidence for the long-term, harmful effects of smoking greatly outweighs the argument that smoking is a benign or harmless activity.

In summary, the research shows that:

- cigarette-smoking is a major cause of various cancers such as cancer of the mouth, larynx, esophagus, and lungs. For every non-smoker who dies from lung cancer, 11 smokers undergo this painful death. Smoking also contributes to heart disease, and respiratory ailments such as bronchitis and emphysema,

- in the long run, smokers lose physical coordination, stamina and strength. Smokers are more apt than non-smokers to be involved in fires and car accidents, and to suffer minor ailments such as colds, coughs and mild viruses.

It follows that smokers lose more time from work, school and play than non-smokers do.

Life expectancy decreases in direct proportion to the number of cigarettes smoked. For example, a 25-year-old man who does not smoke can expect to live eight years longer than a heavy smoker of the same age. This fact represents a loss of about one minute of life for each minute spent smoking.

CAFFEINE Introduction

Mankind has brewed and consumed beverages containing caffeine for centuries. Coffee — the major source of caffeine for North Americans today — was a popular beverage in ancient Egypt. Coffee houses appeared throughout the Middle East as early as 900 AD. Europeans learned about caffeine during the Middle Ages when they used it as a medical agent.

By the 17th century, Europeans consumed coffee daily. By the 20th century, caffeine-containing products could be found in most households throughout Europe and North America.

During much of this time, there was opposition to caffeine usage. In Arabia and Egypt, some early coffee drinkers were severely persecuted for their choice of beverage. Physicians in Europe and North America opposed the drinking of both coffee and tea into our own century. In our time, however, beverages containing caffeine have a respectable status.

Caffeine is probably the most widely used drug in Canada. About 92% of Canadians over the age of 18 consume caffeine-containing products regularly.

A drug which stimulates the central nervous system, caffeine belongs to a class of alkaloids known as the methylated xanthines. Two other xanthines — theophylline, found in tea, and theobromine, found in cocoa — are closely related to caffeine.

First isolated in 1820, caffeine in its pure form is a white powdery solid similar to cornstarch in appearance. Usually extracted from vegetable products, it can also be produced synthetically.

The major caffeine-producing plants include:

- *coffea arabica,* from whose seeds coffee is made

- *thea sinensis,* the source of tea leaves
- *theobroma cacao,* whose seeds yield cocoa
- *cola acuminata,* whose nuts are used in the preparation of cola-flavoured soft drinks.

Plants which yield caffeine do not grow in North America, so that all of the caffeine consumed in Canada is imported.

To What Extent is Caffeine Used?

Approximately 60% of the caffeine consumed by Canadians comes from coffee, 30% from tea, and 10% from cola drinks, chocolate products, and medicines.

The following data further reflect the pattern of tea and coffee consumption in Canada:

- over recent decades, annual consumption of the two beverages has remained fairly steady at about 4.2 kilograms (kgs) of coffee, and 1.1 kgs of tea per capita.
- according to a recent Ontario study, more than 90% of adults in that province drink a caffeine-containing beverage daily, while over 25% of the adults consume five or more cups of coffee and/or tea daily.
- both men and women in Canada drink an average of 2.2 cups of coffee per day. In addition to coffee, women drink more tea than men do so that their overall intake of caffeine is likely higher.
- comparing age groups in Canada, individuals 40 to 49 years of age drink the most coffee — 2.8 cups a day — while younger and older people drink less.
- over the past 10 years, young people have tended to use less coffee, old people more. The volume of tea consumed also increases with age.
- in 1979, Canadians 15 years and older consumed a daily average of 240 milligrams (mgs) of caffeine from coffee and tea alone. Of that total, coffee accounted for 150 mgs, tea for 90 mgs.
- *More than 5% of Canadian adults use caffeine at levels in excess of 600 mgs per day.*

Coffee and tea drinkers are in danger of becoming physically dependent upon caffeine when their daily intake reaches 350 mgs per day. A cause for concern is the fact that one quarter of Canadian adults are at that level now.

In addition to its function in various beverages, caffeine has several medical uses. The drug may be administered to stimulate

breathing, to increase the flow of urine and to relieve migraine headaches. Caffeine has been used with some success as a substitute for amphetamine drugs in the treatment of hyperactive children. Its most extensive use is as an ingredient in beverages and over-the-counter preparations to help combat fatigue.

Caffeine in Beverages and Other Products

The most popular beverages which contain caffeine are coffee, tea, and cola-flavoured soft drinks. Factors which influence the amount of caffeine in these products are plant variety, geographic location, climate, and methods of preparation.

The table below shows ranges of caffeine-content in milligrams per standard, eight-ounce (oz) cup of various popular beverages.

Caffeine Content in Selected Beverages

Beverage	Caffeine Content mg/standard 8-oz cup
Coffee: instant	98-112
freeze-dried	98-112
percolated	155-200
drip/filtered	219-245
Tea: bagged, black, 5 minute brew	62-80
bagged, black, 1 minute brew	34-53
Tea: loose, green, 5 minute brew	56
loose, black, 5 minute brew	64
Cocoa:	16-27
Cola Drinks*:	32-65

*These include beverages such as Cola', Dr. Pepper', Mountain Dew', Pepsi Cola', and Tab'.

The table indicates that the caffeine content of an eight-oz cup of coffee can vary enormously depending upon the product and method of preparation used.

Decaffeinated coffee, on the other hand, contains only about 3 mgs of caffeine per cup. Chocolate bars with cocoa in them contain approximately 25 mgs of the drug per average small bar.

Caffeine is also present in various non-prescription drugs. The table below shows estimates of caffeine content in milligrams per tablet of selected medications.

Caffeine Content of Selected Non-Prescribed Medications

Medication	Mgs of Caffeine/ tablet
Cold tablets (Coricidin', Novahistex')	30
Tablets for allergy relief (Sinarest', Dristan')	30
Pain relievers (Anacin', 222')	15-30
Anti-fatigue tablets (No-Doz', Vivarin')	100-200

Physical Effects of Caffeine

When used non-medically, caffeine is taken orally in tablet form, or in a liquid in which the tablet has been crushed. By prescription, the drug is taken in tablets, in ampoules for intramuscular injection, or as a compound which dissolves in water. Caffeine may be administered orally, rectally or by injection.

The human body absorbs, metabolizes and excretes caffeine rapidly. After the drug is consumed, it quickly passes from the gastrointestinal tract into other parts of the body, penetrating the organs and tissues at varying rates determined by the amount of water ingested. Peak levels are usually reached within an hour following intake. In about three hours, most of the ingested caffeine is metabolized, with only 3% to 6% eliminated, unchanged, in the urine.

The absorption of caffeine by the body does not occur at a fixed rate. The rate of absorption depends upon such factors as the characteristics of the product which contains the caffeine — such as black coffee, coffee with milk, cocoa — and the contents of the stomach. Caffeine in Coca-Cola', for example, is absorbed more slowly than is caffeine in coffee or tea. The difference is due to the lower temperature and higher sucrose content of the cola. Smoking is another variable which affects the rate at which caffeine is

metabolized. Heavy smokers metabolize caffeine more quickly than do light and non-smokers.

Although the body absorbs and breaks down caffeine rapidly, studies indicate that it can take up to seven days before the blood of habitual coffee drinkers becomes completely free again of all traces of the drug.

Hazards of Caffeine

In small dosages of 200 to 300 mgs, caffeine acts chiefly as a mild stimulant with little risk of harmful effects. Such dosages reduce drowsiness and fatigue, improve alertness and quicken thought processes, enabling the individual to achieve greater, sustained mental effort.

Caffeine can also improve performance at some physical tasks. Typists, for instance, may work faster and make fewer errors under the influence of caffeine. At the same time, however, the drug appears to have an adverse effect upon new skills requiring precise muscular coordination or timing such as those involved in operating complex machinery.

As well as increasing an individual's sensitivity to sound and light, modest dosages of caffeine increase breathing, heart, and metabolic rates, urination, and the secretion of gastric juices. Skeletal muscles become less subject to fatigue, while the diameter of blood vessels, coronary circulation, blood chemistry, and blood pressure are affected too. Caffeine also appears to have different and often antagonistic effects upon various parts of the cardiovascular system.

However, even low dosages of caffeine can elicit adverse side effects in some people, effects such as nausea, nervousness, insomnia, headache, vomiting, rapid heartbeat, dizziness, muscle tremor and excessive urination.

Dosages of 700 mgs or more of caffeine are considered excessive and regular intake at this level can bring about a condition called "caffeinism".

Effects associated with "caffeinism" resemble those of anxiety neurosis and range from lethargy to restlessness to mild delirium. Other effects include insomnia, excitement, irritability, headaches, dizziness, sensory disturbances like flashes of light or ringing in the ears, and tense, tremulous muscles. Rapid heart beat, extra heart beats, and increased breathing rate and urination are common.

Large dosages may also induce nausea, diarrhea or constipation, and aggravate peptic ulcers.

Tolerance, Dependence and Withdrawal

When a person has developed tolerance to a drug, more and more of that substance must be consumed to produce its usual effects. While little or no tolerance results from caffeine's effect as a stimulant of the central nervous system, users can develop tolerance to other of its effects — notably the tendency to urinate excessively.

The phenomenon known as "cross-tolerance" occurs when a user who develops a tolerance for caffeine in coffee also displays a tolerance for other xanthines — the related substances in tea and cocoa.

Many caffeine users become psychologically dependent upon the drug to some degree. To them, taking caffeine becomes so much a part of their thoughts, activities and emotions that they find it difficult to stop taking the drug or to function without it. For example, such individuals often say that they need coffee "to get going in the morning". Psychological dependence can develop even in people who do not consume excessive amounts of caffeine.

Mild physical dependence upon caffeine can occur when a person consumes more than 350 mgs a day — a quantity contained in as few as two cups of "strong" filtered coffee. This level is apparently the threshold for the development of dependence, since cessation of caffeine intake from this point can bring on observable signs of withdrawal.

The major symptoms of caffeine withdrawal include lethargy, tiredness, and irritability. Headaches, restlessness and increased nervousness and shakiness have also been reported. These symptoms usually disappear following the resumption of caffeine usage in whatever form.

Over-use of caffeine, and the complications which follow, are frequently experienced by office workers, entertainers, servers in restaurants, night-shift workers, and long-distance drivers.

What About Caffeine Poisoning?

Large dosages of caffeine can lead to a state of caffeine poison-

ing or even death. Fatal dosages for adults fall into the 3,000 to 10,000 mgs range taken in less than an hour. For children, the size of fatal dosage is smaller because of their lower capacity to tolerate the drug's poisonous effects.

The chief danger of caffeine overdose stems not from drinking too much coffee or tea as much as the misuse of tablets containing caffeine. This misuse poses a greater danger for children than for adults because of children's increased sensitivity to caffeine. Care should be taken to keep caffeine-containing tablets out of the reach of children.

The symptoms of acute caffeine-poisoning include convulsions, respiratory failure, then death.

Other Caffeine-Related Hazards

The role played by caffeine in various diseases is a topic which continues to be studied. To date, the numerous studies which have examined the relationship between the consumption of caffeine and health disorders such as ischemic heart disease, hypertension, gastro-intestinal ulceration, cancer of the urinary tract, manifest anxiety and chronic sleep disturbance have all failed to confirm that caffeine plays a significant part in the development of these disorders.

Since caffeine crosses the human placenta and enters fetal circulation, the drug has been studied as a possible health hazard to the fetus, and as a cause of birth defects. Both the fetus and the newborn lack the enzymes necessary to metabolize caffeine quickly, so that the life of the drug in their blood is four days compared to four hours in the blood of adults.

Studies show that caffeine affects the biochemistry of the fetus both directly and indirectly; directly, by altering levels of compounds involved in cellular functions in the fetus, and indirectly by changing the patterns of blood-flow through the placenta. At the present time, however, researchers do not yet clearly understand the full range, duration, and outcome of caffeine's actions on the fetus.

Most of these studies conclude that there is little known danger of caffeine-induced birth defects. Still, one investigation associates high maternal consumption of caffeine — 600 mgs or more daily — with an unusually high incidence of fetal loss. Other research findings suggest that high paternal caffeine consumption may be

linked to higher-than-expected rates of spontaneous abortions, still-births, and premature births among offspring.

Despite the lack of conclusive evidence linking caffeine with birth defects, some researchers, doctors and consumer groups advise women to stop or reduce their intake of caffeine during pregnancy. Caffeine should be avoided, they advise prospective mothers, for the same cautionary reasons that women should avoid the use of unneccessary drugs during pregnancy.

Over-indulgence in caffeine-containing beverages has been cited as a contributing factor in various health problems. Some people become increasingly reliant upon tranquilizers and barbiturates as a means of reducing the side-effects of excessive caffeine intake. Caffeine (usually in black coffee) is sometimes used in attempts to quickly "sober up" individuals who have become drunk on alcohol. Unfortunately, coffee only stimulates an intoxicated person and might acutally induce the drinker to carry out a potentially lethal action such as driving a car.

Caffeine and the Law

Legal restrictions controlling the sale and consumption of caffeine-containing products in Canada do not exist at this time. In the United States, consumer groups are actively lobbying federal authorities to make warning labels on packages of coffee and tea mandatory.

How to Use Caffeine Wisely

As noted above in the brief history of caffeine, caffeine beverages occupy a respectable niche in our society today. Despite their widespread acceptance, however, these drinks can seriously affect the well-being of users. Most potential problems can be avoided by observing these guidelines:

- be aware of the total amount of caffeine you consume routinely. Remember that, for some people, complications can arise even if they drink only two or three cups of coffee per day.
- if you wish to reduce your caffeine intake but not eliminate it altogether, use regular or decaffeinated instant coffee or tea, both of which have a lower caffeine content per cup than do the filtered or percolated coffees.

- take coffee or tea with cream and milk to protect the lining of your stomach from caffeine irritation.
- drink coffee or tea after meals to further protect your stomach lining.
- pace your intake of caffeine beverages to cover an extensive part of the day, thereby allowing your body time to metabolize and excrete the drug between each cup of coffee or tea.
- if symptoms of caffeine poisoning or withdrawal (e.g. headaches) occur, consult your doctor. Switch to decaffeinated coffee, or try non-caffeinated products such as milk, egg-nog, fruit juice, or fruit shakes as alternates.
- although caffeine has not been proven to cause birth defects, it has been implicated in problem pregnancies. For safety's sake, women who are pregnant are advised to consume as little of the drug as possible.
- parents should be alert to the amounts of caffeine which their children consume via cola soft drinks, chocolate products, and cocoa.
- adults who exhibit a heavy reliance on any drug such as caffeine set a poor example of drug-using behaviours for their children.

For further information or assistance, contact the nearest AADAC office. Please consult your telephone directory, or write:

AADAC
BOX 2900 MAIN POST OFFICE
EDMONTON, ALBERTA T5J 2G5

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